Attorney Docket No.: 298-147

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Steinbichler et al. **Group Art Unit:** 2877

Serial No: 09/996,239 **Examiner:** Lyons, Michael A.

Filed: November 28, 2001

For: **PROCESS AND APPARATUS FOR RECORDING THE DEFORMATION...**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION

I, Rainer Huber, do hereby declare:

1. I am one of the joint inventors of the invention being claimed in the above-identified patent application;

2. I have read and understand the Office Action mailed August 16, 2004 by the Patent and Trademark Office in the above-identified application and the art being applied therein, namely U.S. Pat. No. 5,467,184 to Tenjimbayashi et al. (hereinafter referred to as "Tenjimbayashi et al.");

3. The present invention provides an improved reliable evaluation and recording of deformation in an object 1 such as a tire even in the case of relatively large deformations;

4. Referring to preferred embodiments of the invention illustrated in the drawings of the present application, these advantages are explicitly attained by a process and apparatus for recording deformation of the object 1 such as a tire in which a sequence of images of the object 1 is recorded during deformation, phase images are determined from the recorded images using a phase-shifting technique, a differential is formed between two sequential phase images (n+1, n+2), and these differentials are added together, e.g., to the first image. The incremental deformations are thus added together, i.e., integrated, yielding the total deformation of the object 1;

5. In particular, one of the important advantages of the present invention is analyzing the deformation of objects automatically and quantitatively, thereby facilitating reliable evaluation and reducing inspection time. This is attained by the phase-shifting technique where the phase of the radiation from the object 1 is determined by intensity signals from sensor elements 2 (page 2, lines 1-5 of the present application);

6. Tenjimbayashi et al. fail to suggest to me, one skilled in the art, the features of the inventive recording method and apparatus and accompanying advantages, for the following reasons;

7. Tenjimbayashi et al. only teach use of speckle image and do not disclose any phase-shifting technique and generating phase images;

8. Attention is called to the attached excerpt (pages 73-77) from "Digital Shearography" by Wolfgang Steinchen and Lianxiang Yang, SPIE PRESS (2003) (hereinafter "Steinchen et al.");

9. More particularly, Tenjimbayashi et al. merely show a method of deformation measurement using speckle interferometry comprising the steps of forming a series of speckle images (Figs. 8a-8e) at specified time intervals and using the difference

between an appropriate two of the plurality of speckle images to measure the deformation of the object during the time interval between the formation times of the two speckle images (column 1, lines 49-60 and column 5, line 57 - column 6, line 12). Quantitative (i.e., numerical analysis) of a deformation without a phase-shifting technique of Tenjimbayashi et al. can be only be accomplished manually by visualization and not automatically by image processing. (see Steinchen et al., page 73, lines 8-10). Column 1, lines 49-64 of Tenjimbayashi et al., cited by the Examiner in paragraph 4 of the Office Action, fails to disclose or suggest any phase-shifting technique and generating phase-images. Accordingly, it is clear to me, one skilled in the art, Tenjimbayashi et al. just teach the use of speckle images;

10. At the top of page 3 of the Office Action, the following statement appears regarding Tenjimbayashi et al.:

> ....Tenjimbayashi's method, however, relies on speckle images rather than the phase images as claimed.
>
> Tenjimbayashi's speckle images, however, serve the same function as the phase images in the current application....

However, such conclusion still fails to suggest to me, one skilled in the art, determining phase images from the recorded image, forming a differential between two sequential phase images, and then adding these differentials together as recited in independent Claims 28 and 50.

11. Since the analysis of deformation using Tenjimbayashi et al.'s speckle images can only be done manually and qualitatively while the method using the phase images using the phase-shift technique in the present application can be done automatically and quantitatively, thereby reducing the inspection time and facilitating reliable evaluation, Tenjimbayashi et al.'s speckle images, therefore, do not serve an equivalent function as the phase images in the current application. The claimed invention herein therefore constitutes a distinct improvement over Tenjimbayashi et al.;

12. Accordingly, Tenjimbayashi et al. fail to suggest to me, one skilled in the art, the inventive method and apparatus recited in independent Claims 28 and 50 together with the accompanying advantages attainted therein; and

13. All statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and further these statements are made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and such willful false statement may jeopardize the validity of the application or any patent issued thereon.

Sep. 29
Date

Rainer Huber
Rainer Huber